Report from workshop in Stockholm with end-users
"Low hanging fruits in eutrophication management of the Baltic Sea"

Authors: Berit Hasler and Katarina Elofsson, based on presentations at the workshop.

Deliverable 5.3.

Project acronym:	BONUS Go4Baltic
Project title:	Coherent policies and governance of the Baltic Sea ecosystems

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Content of the deliverable:

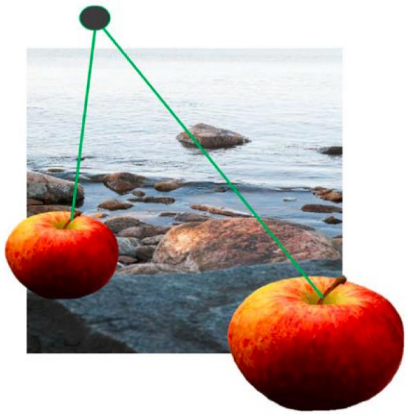
1. Introduction to the workshop and the role of BONUS GO4BALTIC
2. Program and venue
3. Summary of presentations and conclusion, lessons learnt
4. List of participants

1. Introduction

In February 2017 researchers from the projects Nutri-Trade, BONUS BALTCOAST and BONUS GO4BALTIC arrangeed a workshop for researchers, stakeholdes and policymakers on "Low hanging fruits in eutrophication management of the Baltic Sea"- is there still a potential for low cost solutions? The workshop was used to discuss and explore if such potentials still exist, and how this potential can be exploited. The participants were reserachers from Sweden, Finland and Denmark, advisors from Sweden, the BONUS secretariat and representatives from Baltic and Swedish stakeholders and policymakers. Katarina Elofsson from SLU was the primary organiser, representing NutriTrade and BONUS GO4BALTIC.

This deliverable describes the programme and the main messages and conclusions from the workshop.

Invitation



Workshop:

Low-hanging fruits in eutrophication management of the Baltic Sea?

Are there still unused cheap nutrient abatement opportunities? Can abatement costs be reduced and sea conditions be improved by changing the policy mix? This workshop welcomes practitioners and scientists to discuss ways forward for Swedish eutrophication policy in an international context.

Date: Thursday 16th February 2017, 9.30 – 17.00.

Location: KSLA, Drottninggatan 95B, Stockholm

The workshop is organized within the framework of three EU-projects: NutriTrade, GO4BALTIC and BALTCOAST

EUROPEAN UNION European Regional Development Fund · Interreg Central Baltic · NutriTrade · BaltCoast · Go4Baltic · BONUS Science for a better future of the Baltic Sea region

2. The program of the workshop

09:30 - 10.00 Registration and coffee
10.00 Welcome and introduction (Katarina Elofsson, SLU)

Session I: Policies for meeting Baltic Sea targets at low cost
10.15 Ing-Marie Gren (SLU): Cost-effective nutrient management in theory
10.45 Markku Ollikainen (Helsinki University) and Antti Iho (LUKE): Cost-efficient mechanisms for the Baltic Sea: ideas and experiences
11.15 Discussion
12.00 Lunch

Session II: Real-world policies – costs, environmental effects and implementation
13.15 Stina Olofsson (Focus on Nutrients/Board of Agriculture): Focus on nutrients - a voluntary work to reduce nutrient load to the Baltic Sea
13.45 Martin H Larsson (Water Authorities Baltic Proper North): Costs and effects of measures planned for eutrophication management related to the Water Framework Directive.
14.15 Discussion.
14.45 Coffee

Session III: The future: How can real policies become cheaper and more environmentally efficient?
15.15 Berit Hasler (Århus University): Cost-effective management of eutrophication in Denmark and model results – are there low hanging fruits left in the future Danish aquatic policy implementation?
15.30 Katarina Elofsson (SLU): Cost-effectiveness of Swedish nutrient abatement policies.

15.45 Discussion.

17.00 Closing of workshop.

Photo: Andris Andrusaitis, BONUS

3. Summary of presentations and lessons learnt

In February 2017 the projects Nutri-Trade, BONUS BALTCOAST and BONUS GO4BALTIC arranged a one day workshop on 'Low-hanging fruits' – the potential of utilizing low-cost ways to improve the environmental state of the Baltic Sea. Katarina Elofsson from SLU, who had the responsibility of arranging the workshop, opended the workshop, welcoming both practitioners and scientists to the discussion of ways forward for Swedish eutrophication policy in an international context. She formulated the main question for the workshop as "Can abatement costs be reduced and sea conditions be improved by changing the policy mix?". Important challenges are the multiple pollutants, large numbers and types of polluters, and the complex array of existing policy instruments that to some degree affect the incentives for sea pollution.

These were the opening words, followed by recommendations and conclusions from economic theory addressed by Ing-Marie Gren from SLU. In her presentation Gren focused on what we could learn from economic theory, with respect to the establishment of market mechanisms:

- A move towards general economic instruments with offset and credit stacking options is necessary for picking current and future low hanging fruits. Current policy with non-inclusive targets and command and control polices directed towards specific technologies mitigates the potential of low hanging fruits.

A number of design issues are important to pay attention to to aquire cost-effective abatement, e.g. accounting for different effects between point and non-point emissions sources on the sea, management of uncertainty in the environmental effectiveness of measures, inclusion of all possible abatement options and measures. Setting targets as close to the 'problem' as possible is important for cost-effective abatement. The use of economic instruments or nutrient trading markets is a promising way forward. Careful design of the policies should be taken, considering trading ratios, allowing for offsets and credit stacking. Gren also emphasised the need for charging polluters according to their impact on water quality, and to pay attention to the trading ratios between emission sources.

Antti Iho from LUKE, Finland, presented the effectiveness and cost of innovative measures, where nutrient runoff might be reduced by applying gypsum to fields. Another promising avenue is to remove nutrients directly from the Baltic Sea, using harvesting and production of fish and mussels as nutrient mitigation measures. Trade between countries and regions might also be a solution to utilizing the lowhanging fruits that are still unutilized.

Stina Olofsson, Focus of Nutrients and Swedish Board of Agriculture, presented Swedish actions for achieving zero eutrophication as a policy target. Olofsson presented

farm advice activites within the program "The focus on nutrients", where farmers are visited by advisors and the focus are on the different activites and abatement practices shown in figure 1.

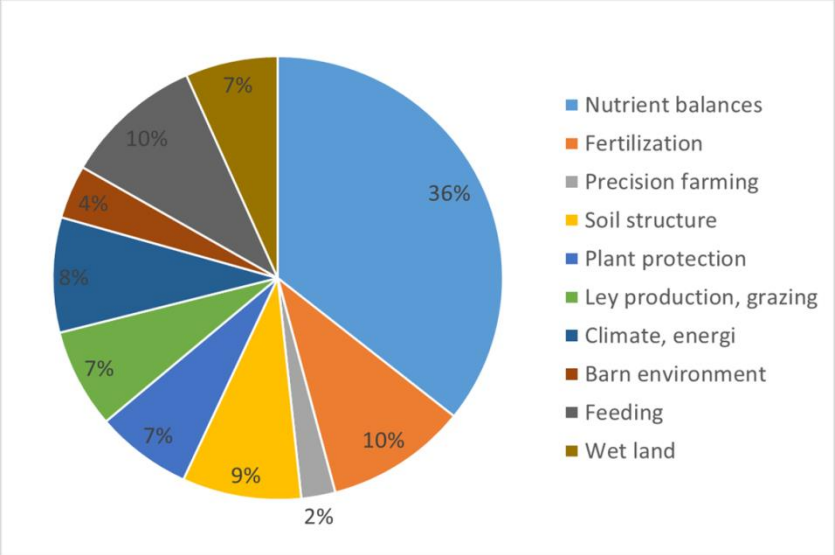


Figure 1: Themes at advisory visits "The focus on nutrient", 2015-2016.
Source: Stina Olofsson.

As part of the visits, farm gate balances are calculated at the first visit and the again after 2-3 years. Data are stored in a database, containing data from more than 8500 farms (on average 2 balances/farm). In addition, nutrient balances can be calculated online by the farmers themselves.

Cost-effectiveness analysis and results for phosphorus abatement were presented by Martin Larsson from the Northern Baltic Sea River Basin District Authority, paying attention to the ranking of abatement measures according to cost-effectiveness. Policy instruments to implement measures, including the low-hanging fruits, could be fees, determined by models and proxy estimates for load reductions.

Berit Hasler from AU, Denmark, presented the Danish present policy debate on nitrogen abatement which include these positions:

- Targeting nitrogen abatement measures is more cost effective than uniform – with a focus on measures, not instruments, and a focus on effectiveness,
- There are potentials for co-benefits between water protection and other policies, such as climate policies.

Hasler gave a presentation illustrating how catchment scale modelling can be used to identify cost-effective mixes and spatial implantation of mitigation measures, and also how and why side effects should be considered as actions to achieve one policy target. E.g., eutrophication mitigation might have both positive and negative effects

on other policies, such as climate mitigation. These aspects should also be considered when attempting to identify and use "low-hanging fruits". She also illustrated that the data are good for spatial assessment and model analyses in Denmark.

Katarina Elofsson adressed in her closing presentation alternative ways to evaluate the cost-effectiveness of past policies. First, the effect and cost of past environmental policy can be calculated using one out of three approaches:

- Take one policy instrument, e.g. the nitrogen fertilizer tax. Calculate the costs and effects of that.
- Build a model and compare firms' decisions with and without the environmental policy in place.
- Find information on the amount of abatement for all measures. Find information on costs and environmental effects. Sum up. Compare to least cost solution for the same total environmental effect.

Figure 2 illustrates the cost-effective Swedish reduction of nitrogen loads to coastal waters as estimated for the BSAP targets, and the real reductions following the implemented policy. This comparison indicate a large discrepancy in where actions are taken and where it would have been most cost-effective. A similar picture is presented for phosphorus in figure 3.

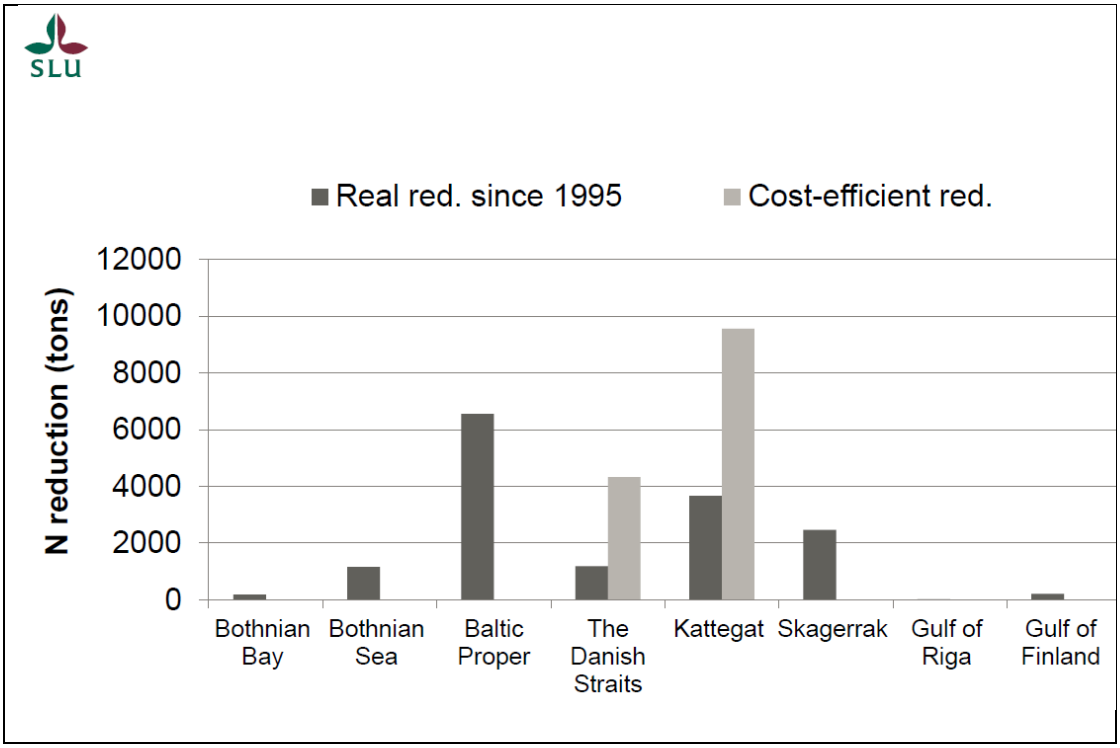


Figure 2: Cost.effective Swedsih reductions of nitrogen loads to coastal waters undr BSAP targets and real reductions thorugh environmental policy. Source: Katarina Elofsson.

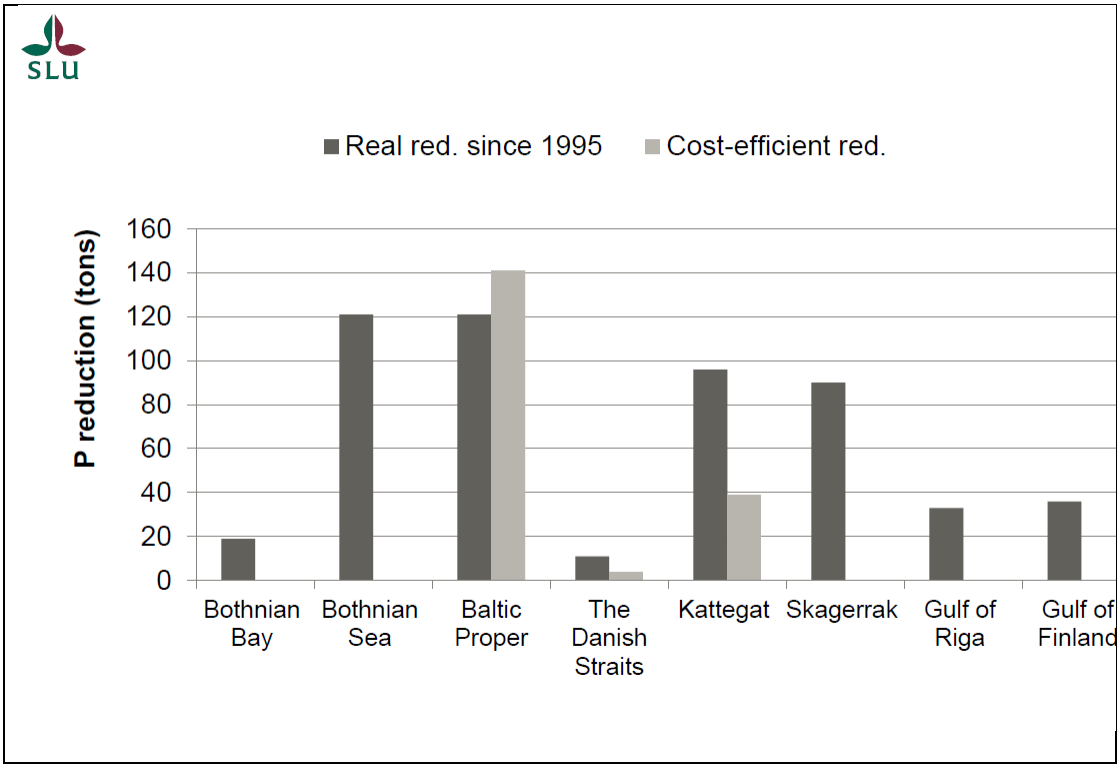


Figure 3: Cost.effective Swedish reductions of phosphorus loads to coastal waters undr BSAP targets and real reductions thorugh environmental policy. Source: Katarina Elofsson.

Conclusions and lessons learnt from the workshop

There are two major sectors causing Swedish phosphorus leakage to the Baltic Sea: municipal wastewater treatment plants and agriculture. Over the past decades, ambitious measures to reduce phosphorus leakage from waste water treatment plants have been implemented by command and control/legislation and permits. There are not many "low hanging fruits" within waste water treatment, most options are utilised.

Regulatory policies, such as the policy used to regulate waste water policy, is not cost-effective ass this type of regulation don't ensure cost-effective allocation betweeen polluters and from the specific pollution sources. Some of the presentations showed the discrepancy between the regulation and the cost-effective solutions; and this discrepancy indicate that the low hanging fruits would be to obtain more cost-effective allocation and choice of measures.

The presentations also indicate that this achievement is dependent on the instruments used, and many presenters pointed at trading mechanisms, between countries and

between polluters, is a promising approach. Much of the workshop was spent discussing the factors of importance for emissions trading or other economic instruments to work well in practice. Furthermore, more focus can be put on measures taken close to the environmental problem, such as measures at sea. These findings and experiences are valuable for BONUS GO4BALTIC, and several of the preliminary conclusions from BONUS GO4BALTIC were presented in the workshop.

4. List of participants at the workshop:

Participation list

Low-hanging fruits in eutrophication management of the Baltic Sea?

Date: Thursday 16th February 2017, 9.30 – 17.00.

Location: KSLA, Drottninggatan 95B, Stockholm

Last name	First name	Organization	Signature
Alm	Anders	WWF	
Andrusaitis	Andris	BONUS EEIG	
Ang	Frederic	Swedish University of Agricultural Sciences	
Ek	Claes	Swedish University of Agricultural Sciences	
Eklund	Lars	Sida	
Elofsson	Katarina	Swedish University of Agricultural Sciences	
Gren	Ing-Marie	Swedish University of Agricultural Sciences	
Hancke	Mamie	Swedish University of Agricultural Sciences	
Hasler	Berit	Aarhus University	
Hyytiäinen	Kari	University of Helsinki	
Håkansson	Cecilia	KTH Royal Institute of Technology	
Iho	Antti	Natural Resources Institute Finland. Luke	
Kinell	Gerda	Water Authority North Sea, County Administrative Board of Västra Götaland	
Klaus	Marc	Race For The Baltic	
Larsson	Martin H	Water Authority Baltic Proper North	

Mäki	Miina	John Nurminen Foundation	
Ollikainen	Markku	Helsinki University	
Olofsson	Stina	Focus on nutrients (Greppa näringen)	
Porvari	Marjukka	John Nurminen Foundation	
Reuterswärd	Ida	Ministry of Environment	
Rudquist	Gun	Baltic Eye/Baltic Sea Center/ Stockholm University	
Scharin	Henrik	Anthesis Enveco AB	
Sandberg	Johannes	LMCG AB	
Sundblad	Eva-Lotta	Swedish Institute for Marine Environment	
Sundby	Jan Olof	The Federation of Swedish Farmers, LRF	
Stålgren	Hans-Olof	Board of Agriculture	
Sönglärd	Peter	The Swedish Water & Wastewater Association, SWWA	
Wallenberg	Peter	The Federation of Swedish Farmers, LRF	
Zandersen	Marianne	Aarhus University	
Svanbäck	Anneka	Stockholm Univ.	
McCrackin	Michelle	"	